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NOTES ON THE STATE EXHIBITS IN THE MINES AND MINING BUILDING AT THE WORLD'S COLUMBIAN EXPOSITION, CHICAGO.

THE Mines and Mining Building at the World's Columbian Exposition contains exhibits of the different mining industries of the various states of the United States and of foreign countries, exhibits of many of the manufactured products derived from these industries, exhibits of various kinds of mining and engineering machinery, and many private mineralogical and petrographical collections of great value and interest. To describe the whole would require a volume, and it is the intention of the present paper to discuss only some of the more important features of the state exhibits, with occasional references to the foreign exhibits.

A mining exhibit should seek to show the actual resources of the region it represents, whether these resources be developed or undeveloped, and to give the different products prominence according to their present or prospective importance to the region. The products of present importance should be exhibited as showing what the region actually produces; the products of prospective importance should be exhibited as showing what the region contains in bountiful quantities, but what is not yet utilized, either from lack of knowledge on the part of the public concerning it, from temporary inaccessibility, or from some other cause. By this means many valuable materials, which have not yet been developed, are brought to the attention of the general public, and often to that of specialists on such subjects, and in this way receive quicker development than if they had not been exhibited. It is often difficult to give the proper relative importance in an exhibit to products actually being mined and those which have not yet been devel-

oped, but an effort can be made in this direction, and it is always possible to state that a given material is not being mined.

A properly arranged mining exhibit affords advantage in two directions. In the first place, it benefits the exhibitor in calling attention to his products, and in the second place it is of gréat educational benefit to the general public as showing what different regions produce. The best interests of the exhibitor are served by a true exhibition of his products; while the educational value of an exhibit depends almost entirely on the exactness with which the exhibit reproduces the actual state of affairs, for if the exhibit is exaggerated in one direction or neglected in another it leaves with the uninitiated a false idea of the resources of the region.

Most of the state exhibits have been collected and arranged by commissioners appointed by the state, and are supposed to fully represent the resources of the state. Many of the foreign exhibits, however, are made up of the individual exhibits of different mining companies, and often show only a certain class of the products of a given region. They are, therefore, not claimed to always represent the whole of the mining industries of a region¹ and cannot be criticised for not doing so. The state exhibits, however, should fairly and honestly represent the mining industry within their borders, giving undue prominence to no one product, and neglecting nothing that should be represented. In this feature some of the states have been highly successful, while others have done worse than make a failure, for they have misled those who are not sufficiently acquainted with the resources of the country to know that the exhibit is not characteristic. Some of the states have exhibited and made very prominent great amounts of materials which they do not possess in paying quantities; other states have actually exhibited materials which they do not possess at all, and which have been obtained from other states, a proceeding which is very misleading to the general public.

¹ A notable exception to this is the New South Wales exhibit, which is one of the best in the building.

It has been the object of Mr. F. J. V. Skiff, Chief of the Mines and Mining Building, to make the mining exhibit truly characteristic of the states and foreign countries represented, and thus to give it the greatest possible value to the general public and to the individual exhibitors. His supervision has been wise and systematic, and it is to him that a large part of the success of the mining exhibit is due. Where failures have been made they have been the fault, not of the Chief of the Mines and Mining Building, but of the commissioners under whose charge the exhibits were prepared, or else of the government of the state or country which they represent. Very often the commissioners have been so hampered by the fancies of the mine owners or others in their districts that, though entirely capable of doing so, they have been unable to make a creditable exhibit of the regions they represent. Many of the state exhibits contain a large amount of good and characteristic material which is often rendered useless and often ridiculous by bad and ignorant arrangement; while many otherwise good and characteristic exhibits are rendered very unattractive by the slovenly way in which they are exhibited and the untidiness of the cases and specimens. Of course the last mentioned defects are minor ones, especially to those interested in the subject; but at the same time the neatness of presentation has a great influence on the attractiveness, and hence on the benefits, of an exhibit to the general public. An exhibit which has no natural beauty may be made very attractive by neat and systematic arrangement, while on the other hand, an exhibit of beautiful things may be made actually repulsive by a slovenly and dirty mode of presentation.

The different state exhibits have been collected and displayed by means of the appropriations made by the various state legislatures for such work. As the amount and conditions of the appropriation varied very much in different states, the size and costliness of the exhibits vary accordingly, and often give a very great advantage to the state with the larger appropriation. In criticising an exhibit, therefore, these circumstances must be borne in mind.

Among the best American exhibits are, beginning with the Eastern states, those of Massachusetts, New York, Pennsylvania, North Carolina, Michigan, Minnesota, Missouri, Colorado, Montana, Arizona, Idaho and California; and in Canada those of the Provinces of Quebec and Ontario. Among the other foreign exhibits that of New South Wales is preëminent in the quality, nature and mode of arrangement of the exhibit. The exhibits of Great Britain, Germany, Norway, Sweden, Denmark, Spain, Greece, Austria, Switzerland, Belgium, Italy, South Africa, Ceylon, Japan, and other foreign countries, are good as far as they go.

Many of the mining exhibits of both states and foreign countries are divided, and put partly in the Mines and Mining Building and partly in the individual buildings of the states or countries in question. Such a course is a great mistake, as it renders the exhibit in both buildings imperfect, and those who see the exhibit in one building without knowing that it is supplemented in another, receive an incomplete, and therefore an erroneous, idea of the products of the country represented. Each mining exhibit should be kept together, whether it be in the Mines and Mining Building or in another building.

The exhibits of the New England states are naturally representative of less economic value than those of some of the other states, because, with the exception of building and ornamental stones, most of their mining products are of subordinate importance; but at the same time they display what they have in a systematic and consistent manner. The Massachusetts exhibit is thoroughly characteristic and well arranged, showing not only the economic products, but also many rocks and minerals of purely scientific interest. The Maine exhibit is also characteristic of the state, while the New Hampshire and Vermont exhibits are small but appropriate, consisting largely of building stones, with mica and other minerals from New Hampshire. The granite of New Hampshire and the granite and white marble of Vermont are displayed on a small but sufficient scale.

Coming westward, the New York exhibit is the first one we

find which is representative of great economic importance. It displays its clays, sands, iron ores, building stones, petroleum, salt, etc., in a thoroughly systematic and creditable manner, and gives a very good idea of the relative importance of the different products.

The Pennsylvania exhibit is somewhat more elaborate than that of New York, as it should be, on account of the greater value of its products. Its immense coal and oil resources, together with its iron, clays, glass-making materials, slates, building stones, etc., are very well displayed. A model showing the method of coal mining and relief maps of the anthracite basins and of the whole state add to the attractions of the exhibit. A large series of samples of crude and refined petroleum are an appropriate and interesting feature of the exhibit. A large column of anthracite in a conspicuous position in the centre of the building, and apart from the rest of the Pennsylvania exhibit, represents a vertical section of the "mammoth seam" on the property of the Lehigh Valley Coal Company. A second column, near the main Pennsylvania exhibit, is composed of blocks of the different products of that state, varying in size according to their importance, the smaller blocks being placed successively higher in the column.

New Jersey makes a much less elaborate exhibit than either New York or Pennsylvania, though it is neatly arranged and in some respects it is good. The magnetic iron ores of the northern part of the state, and the clays, marls, and other products are well exhibited. The zinc deposits of Sussex county, however, are only poorly represented, and in this respect the exhibit might have been improved. A glass-plate model of the zinc mines at Mine Hill, Franklin Furnace, Sussex county, is an attractive feature.

Virginia makes a very characteristic and well arranged exhibit, though the fact that the materials exhibited are not in cases detracts from their neatness. A large display of coal and coke, so rapidly becoming the most important products of the state, is made; while the characteristic brown hematite (limon-

ite), the manganese ores, zinc ores, clays, fire-brick, and slate of that state are represented. The Bertha Zinc and Mineral Company displays the zinc ores of the southwestern part of the state and the spelter made from them, as well as statues, wire, etc., made from the spelter.

West Virginia makes a fine display of coal and coke, at present two of its most important industries. Such an exhibit is very appropriate when we consider that forty-eight out of the fifty-two counties of the state are said to contain more or less coal. The salt, mineral waters, crude and refined oils, iron ores, and building stones are also displayed.

North Carolina makes a very neat and characteristic exhibit of iron ores, auriferous quartz, mica, kaolin, asbestos, building stones, gems, etc. The gems include diamond, sapphire, topaz, ruby, beryl, garnet, rutile, chalcedony, etc. A number of interesting models of gold nuggets are also displayed. A number of photographs of different districts form a part of the exhibit, which is neatly and systematically arranged.

South Carolina makes a good exhibit of its great phosphate industry, displaying the crude phosphate and also the manufactured superphosphate. The phosphate industry far eclipses in importance all other mining industries in that state, and the others, such as gold, iron, and manganese mining, in the western part of the state, are of very little and very unstable importance, and are not represented.

Florida, long unknown to the mining industry, has suddenly become of great importance on account of the recent discovery of its phosphate deposits. A small exhibit of these phosphates is made in the Mines and Mining Building, but it is not sufficiently extensive to do credit to a young and rapidly growing industry.

Louisiana makes a very appropriate exhibit of its mining products, among which are lignite, oils, salt, sulphur, marls, clays, chalk, building stones, grindstones, mineral waters, and other minor materials.

The Tennessee exhibit consists mostly of a "Mineral Exhibit

of Harriman, Tenn.," and shows the coal, coke, fossil and magnetic iron ores and brown sandstone produced in that district, together with the pig iron manufactured. The exhibit is creditable to Harriman, but it is a pity that the state of Tennessee in general did not make a full display of its coal, iron, marble, and many other mining resources. The Cleveland Fire Brick Company of Cleveland, Tenn., makes an exhibit of its clays and bricks.

Kentucky makes a good and extensive exhibit of coal and coke, with smaller collections of iron ores, building stones, clays, bricks, etc. A relief map of the state is also an attractive feature of the exhibit. The exhibit contains a large amount of good material, but it might be displayed to better advantage.

Ohio makes a good exhibit of coal, its most important mining industry, and also displays on a smaller scale its crude and refined oil, its salt, clays, iron ores, whetstones, etc. It presents a good model of a salt refining works, and makes a very attractive display of the bricks, tiles, etc., made from its clays.

Indiana makes a good business-like exhibit of just what it has and no more, including a display of coal, clays, building stones, oil, mineral waters, and tiles, and glass manufactured from native products. The exhibit is well arranged and shows all that is necessary.

Illinois makes an extensive display of its clays and the various manufactured articles made from them. A much more extensive mining, mineralogical, and geological exhibit of the state is made in the large state building elsewhere on the World's Fair grounds. This exhibit is well arranged, and truly indicative of the products of the state.

Michigan makes one of the most elaborate exhibits of all the states. The three great mining products of this state are iron, copper, and salt. The first two are excellently represented ; the last is much neglected. The different kinds of iron ore are illustrated with numerous specimens ; and a large colored cross-section of the Cleveland Cliffs Iron Company's mine is given. A wooden model of the No. 4 Ore Dock at Marquette,

on the Duluth, South Shore and Atlantic Railroad, gives a good idea of the method employed in handling large quantities of ore. The different modes of occurrence of the copper of Michigan are shown by a number of well selected specimens; while the copper in ingots, sheets and wire is well displayed. Interesting wooden models are given of the shaft house and mills of the Calumet and Hecla mine, and of the rock and shaft house of the Tamarack mine. Other interesting features of the exhibit are a number of pre-historic copper implements from Michigan, and arches and columns of brown sandstone produced in the state.

The Wisconsin exhibit contains some good material, but it seems to be arranged more to give prominence to fine specimens than to show systematically the products of the state. The lead and zinc industries of the southwestern part of the state are well represented, but the great iron interests of the northern part of the state are neglected, one pile of ore indefinitely marked "iron ore" and a few other odd specimens being all that are displayed. Some good specimens of granite and columns of red sandstone are also exhibited. In addition, various mineral specimens are displayed, some of which have come from other localities than Wisconsin, and are therefore misleading to the uninitiated.

Minnesota confines its exhibit almost entirely to its greatest mining industry, *i. e.*, the iron of the northern part of the state, and in this department the exhibit is very good. Some building stones and a few mineral specimens are also displayed. A wooden model of the Chandler mine, and a number of maps showing the mines and the geology of the state also form a part of the exhibit.

Iowa makes a small but fairly characteristic exhibit, consisting mostly of coal, building stones, etc. A feature of the exhibit is an artificial "drift" in a coal mine, showing the mode of working and transporting coal on underground tramways. A model of a coal shaft and breaker is also given.

The Missouri exhibit is excellently arranged, and is thoroughly indicative of the resources of the state. The lead, zinc and iron industries are well represented, and pig lead and

zinc spelter are displayed with the ores from which they are derived. A model of the dressing works of the Saint Joseph Lead Company and a relief map of Iron Mountain, colored to show its geology, are interesting features of the exhibit. The coal industry of the state is also represented, together with a number of building stones, ochres, etc., and a fine collection of calcite and other mineral specimens from the lead and zinc mines.

The South Dakota exhibit consists largely of tin ore, auriferous quartz, mica and some argentiferous galena, and is essentially a Black Hills exhibit. "Lode" tin ore and stream tin, as well as pig tin manufactured from the ores, are exhibited in large quantities. A large column of tin ore, from the property of the Harney Peak Consolidated Tin Company, contains a placard stating that the capital invested is \$3,500,000, a fact it is difficult to understand they should wish to make so prominent in view of the unproductive history of their operations. The auriferous quartz is a good exhibit and characteristic of the quartz deposits of the Black Hills. Some beautiful pieces of Arizona silicified wood, which were polished in Dakota, are exhibited, but in lack of the proper explanation as to their source, they are misleading, as they suggest Dakota as the region from which they were derived.

Kansas makes a very good exhibit of lead and zinc ores with the pig lead and zinc spelter derived from them. The exhibit also includes a display of rock salt, gypsum, building stones and other minor products. The exhibit is small, but it is characteristic of the state and is well arranged.

Montana makes a good exhibit as far as it goes, but many localities and many important deposits are not represented. The best exhibits are from the great mining camp of the state, *i. e.*, Butte City. The great copper and silver interests of this district—especially the former—are well presented, and large quantities of sulphide copper ores, and the metallic copper made from them, are displayed. A quantity of gold quartz, and an interesting collection of gold nuggets are also a part of this exhibit.

The most prominent feature of the exhibit, however, is a solid silver, life-size statue of the celebrated actress, Ada Rehan, standing on a globe which in turn rests on a base of solid gold. The whole work represents several hundred thousand dollars worth of precious metals, all the products of Montana mines.

Wyoming makes a neat and effective exhibit. It consists largely of coal in columns and blocks, jars of petroleum, blocks of sulphate of soda and sulphate of magnesia, "lode" tin ore and stream tin ore from the northeastern part of the state, adjoining the Dakota tin region, iron ore, copper ore, auriferous quartz, lead carbonate, asbestos, agates, clay, sulphur, building stones, etc.

Colorado makes a fairly good display of its silver-lead ores, copper ores, gold ores, coal and manufactured lead and copper. Some of the building stones and iron ores of the state are shown, but these materials are not fully represented. An instructive feature of the exhibit is a series of cases of gold nuggets, dust gold and sheet gold from Breckenridge, Colorado. Many of the important mining camps in the state are represented, especially Aspen, Leadville, Creede, Cripple Creek, etc. The exhibit is fairly good, but a state of such immense mining wealth as Colorado could have made a much better one.

The Utah exhibit contains a large amount of valuable material, but it is too much crowded and badly arranged. The desire for a display of brilliantly contrasted colors has in some cases entirely upset the systematic arrangement of the exhibit, and has given part of it the appearance of the toy boxes with pieces of minerals glued on the outside that are sold to confiding tourists in our western states as works of art and value. The exhibit represents the varied mining industries of the territory, among the most important substances being coal, gilsonite, albertite, elaterite, asphalt, oil shales, sulphur, salt, iron ores, copper ores, silver and gold ores, building stones, etc. The exhibit of articles "japanned" by the gilsonite varnish are of interest. Some large specimens of silver-lead ores and ores containing chloride of silver are characteristic of the mines producing them.

The New Mexico exhibit contains some good material, but is not very well exhibited. The silver ores, one of the most important products of the territory, are well represented, being grouped according to the localities from which they came. A small cabin in the centre of the exhibit is composed of silver, lead and gold ores from different localities. A stuffed burro carrying a prospector's camping outfit is a somewhat sensational feature of the exhibit. A column of coal from Blossburg and Los Cerillos represents the growing coal industry of the territory.

The Arizona exhibit is very good and well arranged. It is truly indicative of the products of the territory. The most important features of it are the copper ores, the silicified wood and the gold ores. The copper ores especially are well represented, and a beautiful column of green and blue carbonates of copper from Bisbee forms the most prominent feature of the exhibit. While in the Michigan exhibit we see only native copper, in the Montana exhibit only sulphides of copper, here in the Arizona exhibit we see mostly carbonates of copper with some silicate and oxide of copper. Thus in these three copper districts we have representatives of three great classes of copper ores. An interesting feature of the Arizona copper exhibit is a series of models showing the underground workings of the Copper Queen Consolidated Mining Company at Bisbee. The Old Dominion Copper Company whose mines are at Globe, Arizona, makes a very excellent exhibit of its ores and its copper ingots in a cabinet alongside the main Arizona exhibit. The gold ores of Arizona are well represented, and some of the silver ores are also shown, while the beautiful polished sections of the celebrated silicified wood of Arizona form an attractive and interesting feature of the exhibit. Some of the so-called "onyx" is also exhibited in polished slabs.

Nevada makes a fairly good exhibit of its mining products, mostly the silver ores abundant in this region, and the accompanying minerals. A "special exhibit" from Eureka, Nevada, contains a number of interesting specimens.

The Idaho exhibit is fairly good, but not thoroughly characteristic of the state. The most prominent features are the silver-lead ores from the northern part of the state, green copper carbonates, and a mineral water known as "Idanha" from Soda Springs. A number of photographs of different mining districts are of interest.

Washington makes a fairly good, but poorly arranged, exhibit of gold ores, silver ores and silver-lead ores, and a few other products. The coal resources of the state are entirely neglected, though they are well represented in the Washington state building. This separation of the mining products of a region, and their distribution partly in one building partly in another, is a great mistake, as it gives a person who sees only one of the exhibits an incomplete and therefore an erroneous idea of the resources of the state. The exhibit should be all in one or the other building.

Oregon makes a large exhibit of auriferous quartz and shows a very good working model of hydraulic mining. Some building stones are also represented. The exhibit is very good so far as it goes, but it does not do justice to the state, as many of its developed and undeveloped resources such as iron, coal, etc., are not represented.

California makes a good exhibit, and one characteristic of the resources of the state. It is very appropriately composed largely of gold ores and a display of the methods of gold mining. The auriferous quartz of the celebrated Grass Valley and other localities is well represented. An interesting feature is a wooden model by A. C. Hamilton showing a system of mine timbering. Stibnite from San Benito county and the metallic antimony derived from it are also represented. Among the other prominent features of the exhibit are iron ores, asphalt, oils, slate and a beautiful display of ornamental and building stones. The so-called "onyx" from San Luis Obispo county, and the colored marbles from Inyo County are exceedingly beautiful. The exhibit is entered through arches built of the various ornamental stones of the state, while blocks of rock containing the beauti-

ful rubidolite, or pink tourmaline, are displayed at the entrance. Elsewhere in the building is a fine and beautiful exhibition of the so-called "onyx" from New Pedrara, in Southern California.

Besides the California exhibit in the Mines and Mining Building, an interesting collection of the mining products of the state, especially gold ores and native gold, are contained in the California state building. Somewhat similar specimens, however, are in the Mines and Mining Building, so that the division of the collection in this case is not especially injurious.

Among the foreign collections, that of New South Wales stands preëminent. The great mining wealth of this province is exhibited in a very systematic and thorough manner, and an excellent idea is given of the resources of the region. There is no attempt at a display of a sensational character as is seen in some of the exhibits, but everything is shown in a plain business way, in large quantities and in properly selected samples. Among the most prominent features of the exhibit are its tin, gold, silver, lead, antimony, copper, iron, manganese, and chromium ores, its coal, graphite, building stones, etc. The ores exhibited are average samples such as are sold in the market, and therefore give a true idea of the deposits represented. In many cases, as in antimony, tin, etc., the metals are exhibited in blocks or pigs, with the ore from which they are derived. The ores of the great Broken Hill silver mine and the statistics of its production are of interest to those acquainted with this famous mine. The exhibit of the tin industry is of great interest as representing the development of this comparatively new tin region, which has only been much developed since 1872; while the coal exhibit shows not only the bituminous coal of the region, but also the kerosene shales, etc.

Among some of the other foreign exhibits those of the provinces of Ontario and Quebec are very good, showing as they do the various products of those provinces in a thorough and systematic order. The other provinces of Canada do not make such good exhibits. A collection of the rocks of Canada by the Geological Survey is of great interest. Mexico exhibits a great

amount of material, but it is so arranged that it loses much of the benefit that it might afford to the exhibitors and to the public. Brazil makes a fairly good exhibit, while Chile, Ecuador and other South American countries are also represented. The South Africa diamond exhibit is very interesting as showing the mode of occurrence, methods of mining and washing, and cutting the diamonds. The exhibits of Great Britain, Germany, Japan and other foreign countries are also of interest. La Société "Le Nickel" of France makes a very interesting exhibit of its nickel ore in New Caledonia, the nickel derived from it, pictures of the mine and various other interesting features of the industry.

Many others of the numerous exhibits of American and foreign products in the Mines and Mining Building might be mentioned, but lack of space forbids further elaboration. The same cause makes it necessary to discuss in another article the extensive and excellent exhibition of the United States Survey in the Government Building.

R. A. F. PENROSE, JR.